

## Water Ice Grain Size Variations on Europa

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Surface particle grain size information plays an important role in geological investigations because it serves to constrain hypotheses for the origins and subsequent evolutionary modifications of surface materials. Data from the Near-Infrared Mapping Spectrometer (NIMS) onboard the Galileo Spacecraft may be employed to constrain water ice grain sizes for a variety of icy surface terrain types on Europa. In this investigation we employ a pair of NIMS observations that imaged high and low latitude regions on Europa's leading side in a search for regional differences in characteristic water ice grain sizes.

The reflectance of remotely-sensed water ice varies as a function of the incidence and emission angles, and with grain size. We employ the wavelength-dependent complex index of refraction for water ice at 120 K (B. Schmitt, personal communication, 2000) to model the NIR reflectance of water ice of varying grain sizes for observing geometries corresponding to those of the NIMS observations. Comparisons of modeled and observed spectra permit us to constrain the range of grain sizes present.

The equatorial and high-latitudes spectra show some differences, such as the presence of a weak continuum absorption near 1.3 microns for the equatorial region that is not evident in the high-latitudes spectra. However we do not find significant differences in the characteristic water ice grain sizes for the high and low latitudes observations; in both cases the typical grain diameter appears to be 50-100 microns, a result consistent with prior estimates for other regions.

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